State of Maryland
BOARD OF NATURAL RESOURCES

INVENTORY PLAN MARYLAND'S NATURAL RESOURCES

R. V. TRUITT

January, 1948
Educational Series, No. 19

Department of Research and Education
Solomons Island, Maryland

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INVENTORY PLAN MARYLAND'S NATURAL RESOURCES

It is generally recognized that natural resource management, like business management as a whole, requires knowledge of stocks on hand as a starting point in the formulation of sound, long range management programs whether they be concerned with the development and use of fish or fowl, soil or water, or tree or bird. To this end, the Department of Research and Education is sponsoring a movement, in which it asks the cooperation of the other agencies in the Board of Natural Resources, looking to the acquisition of a comprehensive body of knowledge, not now available, concerning the abundance, type, quality and importance of the many and varied natural assets of the State. The Department proposes to start forthwith to inventory these assets, in the field, to effectuate which a competent group of investigators is to be employed. The information to be obtained from the study is to be made available in its entirety to the Board and its subsidiary departments, together with the State Soil Conservation Service and the State Planning Commission, which agencies administer the different programs of the State.

It is planned that in due time the Resource Inventory will provide a comprehensive understanding of the extent and worth of the natural resources and the part they play in the socio-economic well-being of the State. More particularly the Inventory is expected to serve not only to point out the value of the resources at the time it is being carried on, but to project the potentialities of these resources realizable through the continuation of existing sound policies of management and through the institution, as may be suggested from the work, of new and possibly better long range programs of management and administration. The invetorying process is expected to be a continuing one, including resurveys, in which, to some little extent, emphasis will be placed on problems commonly recognized as being in need of immediate or early elaboration and action, such as that currently existing in the field of pollution. It is the plan

of the Department of Research and Education to organize from time to time, as the work progresses, the data that accrue from the study and publish them for public use.

The inventorying in the initial phases of the study will proceed water-shed by water-shed, into which classification the State lends itself to seven major divisions and several minor ones. This approach through study of natural units will make possible greater coordination of effort and manpower use, while the many resources involved can be more effectively inventoried isolatedly as well as in their relationships to the general resources of the region. That is they can be brought into proper perspective in relationship to their interdependence and to the overall conservation problem. In this connection, it should be indicated that the problem of soils, the inventorying of them and their best use is an outstanding one, although this feature of the conservation program of the State has been more extensively treated, perhaps both in terms of money and directed effort spent on it, than other segments of the work with consequent showing of results. How the soil conservation problem can be furthered by the present program, and conversely, is a matter that needs special consideration and treatment in view of the fact that such work is basic to all phases of conservation, while it is administered by an agency not subsidiary to the Board of Natural Resources. Coordinated interest and action between the Soil Conservation Service and the agencies of the Board is paramount.

The following breakdown according to the major resources, exclusive of soils, is suggested as a tentative program for an attack on the Statewide inventorying of natural resources:

WATERS

The waters of the Chesapeake Bay and the surface and ground waters are being studied intensively in certain particulars at this time by State and Federal agencies. It appears, then, that the major water studies in this program should be concerned with the biology, physics, and chemistry of the fresh-water bodies of the State, the results to be coordinated with those obtained from Bay and ground-water studies, to provide a com-

prehensive body of information for the development and use of this basic resource. It is planned to have the study carried on by individual drainage systems. Accordingly, the following approach to the overall study of freshwater is offered for consideration:

A. Drainage areas
   1. Existing maps
   2. Stream profiles

B. Water Quality
   1. Volume
   2. Temperature
   3. Color
   4. Turbidity
   5. Oxygen
   6. Carbon dioxide
   7. pH
   8. Hardness
   9. Pollution

C. Biology
   1. Check-list
      a. Vegetation, both aquatic and emergent
      b. Bacteriology
      c. Invertebrate, both parasitic and beneficial
      d. Vertebrate—predator, forage and game forms
   2. Populations

E. Records
   1. Field notes
   2. Permanent records

F. Possible use of data
   1. Board of Natural Resources
   2. Department of Geology, Mines and Water Resources
   3. Maryland Water Pollution Control Commission
   4. Department of Game and Inland Fish
   5. Department of Tidewater Fisheries
   6. Department of Research and Education
   7. Department of Health

8. Soil Conservation Service
9. State Planning Commission
10. Maryland Development Bureau

G. Sources of help

1. Department of Research and Education
2. Department of Game and Inland Fish
3. Department of Geology, Mines and Water Resources
4. Maryland Water Pollution Control Commission
5. Department of Tidewater Fisheries
6. State Planning Commission
7. U. S. National Museum
8. U. S. Fish and Wildlife Service
9. Educational Institutions

FISH

Through the Maryland Management Plan, a comprehensive record of the fishing effort, number of fishermen, types of gear, and the yields is now being developed by the Department of Research and Education. There is need of records to cover that segment of net fishing done by farmers and others who, by law, are permitted to operate under specified conditions without license. Also, there is marked need of information on the immense sport fishing effort in Tidewater, now largely unknown though vast in proportions. By combining information from all of these sources with the research data being derived from fish studies at the Chesapeake Biological Laboratory, an inventory of great value can be made against which the degree of success of the marine management programs can be measured.

During 1946, 48,371 persons were licensed to fish in the inland waters of Maryland. With what success from the angler's viewpoint, and from the viewpoint of management of these waters through stream protection, stream improvement, hatcheries, and fish plantings is not known. Nor is there specific information as to the nature of the different aquatic environments involved in the support and production of the several kinds of game fish. It is expected that the research projected in this program will provide data to make possible the analysis of the fish populations as well as information with which to

measure the aquatic environments to make possible the determination of the ultimate carrying capacity of the different bodies of water.

A. Salt-water fisheries

1. Commercial fisheries

a. Fin-fishery

(1) Check-list of species (records available, Chesapeake Biological Laboratory)

(2) Populations by species (records available, Chesapeake Biological Laboratory)

(3) Annual harvest by species (records available, Chesapeake Biological Laboratory)

b. Oyster

(1) Annual harvests (records available, Tidewater Fisheries)

(2) Populations by areas and by beds

(3) Intensity of culture

c. Crab

(1) Annual harvests (records to be available, Chesapeake Biological Laboratory project)

(2) Populations by areas (records to be available, Chesapeake Biological Laboratory project)

(3) Factors controlling abundance

d. Terrapin

(1) Distribution

(2) Abundance

2. Non-licensed fisheries

a. Farmers, shore dwellers, *et al.* (records to be available, Tidewater Fisheries and Chesapeake Biological Laboratory)

b. Tidewater sport fishing (records to be available, Chesapeake Biological Laboratory and Department of Tidewater Fisheries)

B. Fresh Water

1. Check-list of species found (records available, Chesapeake Biological Laboratory)
2. Populations of game species
3. Annual harvest of game species

C. Value of fisheries

1. Commercial species (records available, Chesapeake Biological Laboratory and Department of Tidewater Fisheries)
2. Game species
3. Fisheries by-products (records available, Chesapeake Biological Laboratory and Department of Tidewater Fisheries)
4. Value in terms of business

D. Possible Use of data

1. Board of Natural Resources
2. Department of Game and Inland Fish
3. Department of Tidewater Fisheries
4. Department of Research and Education
5. State Planning Commission
6. Maryland Development Bureau

E. Sources of help

1. Department of Research and Education
2. Department of Game and Inland Fish
3. Department of Tidewater Fisheries
4. Maryland Development Bureau
5. U. S. National Museum
6. U. S. Fish and Wildlife Service
7. Educational Institutions

FORESTS

The major purposes of the forestry phase of the Inventory are to take stock of the State's some 2,700,000 acres of forests and to bring into full relief the *status quo* and effectiveness of the forest development programs, both public and private, Statewide. The need of factual information concerning the forests and their management is indicated by the magnitude of the annual yields which have been of a value in excess of $8,000,000 annually since 1940. Such yields constitute an outstanding resource value to the State, although the timber lands are at a comparatively low level of production, roughly 20% of the volume that could be harvested if established scientific methods of management were fully resorted to. The approach outlined below should provide information to become the basis of management for production among the different tree species at anticipated levels up to maximum yields according to forest and soil types, and according to regions.

It is expected in the longer aspect that the project would include a study of growth rates among the major commercial species in the different areas of the State, as well as a study of the effectiveness of artificial seeding, planting, thinning, cutting and related practices of forest management.

A. Amounts of merchantable timber
   1. By size
   2. By species
   3. By stands

B. Amounts of immature timber
   1. By size
   2. By species
   3. By stands

C. Description of forest types by means of photo classification.
   1. Species composition
   2. Slope and aspect

3. Soil
    a. Type
    b. Land use capability
4. Forest floor
    a. Ground cover
    b. Humus
    c. Natural seeding

D. Mapping of areas including aerial surveys

E. Growth in the major commercial species

F. Damage to forests
    1. Fire
    2. Grazing

G. Ownership

H. Public lands
    1. Extent
    2. Value
    3. Use

I. Possible use of data
    1. Department of State Forests and Parks
    2. Department of Game and Inland Fish
    3. State Planning Commission
    4. Maryland Development Bureau
    5. U. S. Forest Service
    6. U. S. Fish and Wildlife Service
    7. Department of Research and Education

J. Sources of help
    1. Department of State Forests and Parks
    2. Department of Research and Education
    3. State Soil Conservation Service
    4. Maryland Development Bureau
    5. U. S. Forest Service
    6. Educational institutions

WILDLIFE

Wildlife constitutes, perhaps, the most difficult natural resource to be dealt with in this study due to diversity of forms, variable types of habitat, and the mobility of its components. Potential numbers and values can be rather accurately estimated through a survey of the feeding, nesting, breeding, and cover areas used by the different forms. In the absence of kill statistics and related data, as a basis of understanding and as an approach to this problem, it appears necessary to make censuses by meadow, by open field, by woodlots, and by forest to which end respective regional representatives of the Department of Forests and Parks, and, especially, the Department of Game and Inland Fish can contribute greatly, particularly in the contacts that are to be made with the people on the spot of inquiry who know well the conditions around them. Success of this phase of the overall inventory will depend, in no small degree, upon accuracy of observation as well as upon close relationship and coordination of effort between the cooperating agencies.

A. Check-list of species
   1. Upland game birds
   2. Waterfowl
   3. Non-game birds
   4. Game Mammals
   5. Non-game mammals

B. Populations of game forms
   1. Mammals
   2. Birds
   3. Distribution

C. Food and environment relationships

D. Mortality
   1. Hunter kill
      a. Random sample
      b. Checking stations

2. Natural losses
    a. Predation
    b. Disease

E. Value
    1. Recreation
    2. Furbearers
    3. Food
    4. Business

F. Possible use of data
    1. Board of Natural Resources
    2. Department of Game and Inland Fish
    3. Department of Tidewater Fisheries
    4. Department of Forests and Parks
    5. Department of Research and Education
    6. State Planning Commission
    7. Maryland Development Bureau
    8. U. S. Fish and Wildlife Service

G. Sources of help
    1. Department of Research and Education
    2. Department of Game and Inland Fish
    3. Department of Forests and Parks
    4. State Planning Commission
    5. Maryland Development Bureau
    6. U. S. Fish and Wildlife Service
    7. U. S. National Museum
    8. Educational institutions

MINES AND WATER RESOURCES

The coal yields of Maryland have declined in a marked degree, the economic results of which are being reflected into the several communities where this resource is a part of the local economy. Since this commodity is non-renewable and since there are no new veins at comparable levels on which to operate, two ap-

proaches to possible continued production are being explored. Through the Department of Geology, Mines and Water Resources, the U. S. Bureau of Mines is conducting explorations in an effort to determine whether or not there are new sources of coal at the deeper levels. The Director of the Department has reported the progress of these tests to the Board of Natural Resources from time to time. The second source of supplementary supplies of coal has been through strip-mining, the success and progress of which likewise have been reported to the Board.

In view of the *status quo* in the coal industry and its administration from the viewpoint of conservation, the Department of Research and Education does not offer a program to inventory this resource. Rather, it seeks the advice of the Department of Geology, Mines and Water Resources as to the possible usefulness of the Survey Party while at the far ends of the State. It will attempt, however, to determine the extent of land surface affected by the strip mining operations in the State, now becoming great, and the relationships of same to conservation problems involving forests, wildlife, erosion and scenic beauty.

The problems of surface and ground waters in the larger measure have been attacked through added funds and personnel especially dedicated to this program of the Department of Geology, Mines and Water Resources. While the coverage here, through well registration, added gauging stations, test wells, etc., has been greatly expanded in recent years, there remains a marked need of test centers with a view to long time operation; short period observations being virtually worthless in this field of study. Three deep wells now in excellent condition at the Solomons Annex are to be made available, as needed, for long time use to this end. The Department of Research and Education plans certain studies of all bodies of freshwater as indicated under the heading "Waters" herein. To the extent that the Survey gathers data on such bodies of water, there will accrue information of value to the Department of Geology, Mines and Water Resources, as well as to other State bodies, thus that agency's advice in the developments of the program and such field help and direction as its workers may be in a position to provide will be helpful.

While records of types of earthen material, their abundance and the volumes of them used are available in a large measure in the Department of Geology, Mines and Water Resources, there is need of more comprehensive information about the location of mining and quarrying operations that are now being carried on. Included in these observations will be sand, gravel, limestone, shale, gypsum, fire clays and other such resources used for industrial purposes.

SUMMARY

The outline presented herein is tentative and suggestive in nature, though basic in principle. Liberty has been taken to list agencies and proposed procedures for them without consultation with those affected. There can be little doubt, however, about the need of the program as a whole since only by determining, actually knowing, the stocks on hand can adequate programs for the administration and restoration of natural resources be formulated and effectuated. To have programs of a hit-and-miss nature, such as all too many of them have been in the past, and with results in condition of soil, minerals, water, timber, fish, fowl and game that now exist, inevitably leads to further exhaustion of natural wealth. An outstanding result of a continuing inventory when the entire State has been covered, will be data accrued against which, through resurvey or through random sampling, the progress and the contribution of conservation regulations, practices and administration can be measured and altered, if need be, to improve situations.